MONTHLY WEATHER REVIEW,

JANUARY, 1875.

WAR DEPARTMENT,

Office of the Chief Signal Officer,

DIVISION OF

TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

INTRODUCTION.

In the preparation of this Review, besides the regular reports from the Signal Service stations, United States Army, and Canadian stations, there have been examined monthly meteorological records from many volunteer observers and post surgeons, the latter forwarded by the Surgeon General, United States Army, and other records, from which valuable data have been extracted. Chart No. I, showing the movement of areas of low and high barometers, and chart No. II, giving the isothermal and isobaric curves and prevailing direction of the wind for the month, have been prepared from the observations taken at the Signal Service and Canadian stations alone, for the reason that the barometers and the thermometers of the volunteer observers have not been compared with the Signal Service standards, and their instrumental errors are not known.

The most noticeable features of the month are the tracing, approximately, of the paths of several storm-centres from the Pacific coast to the Atlantic coast; the deficiency in the mean temperature in all the districts east of the Rocky Mountains, compared with the average of many years, as well as that of January, 1874; the excess of barometric pressure over that for the same month, 1874, in all the sections, except on the South Atlantic and Gulf coast; the large excess of precipitation in the South Atlantic and East Gulf States and Tennessee above the average; decidedly lower water in the Ohio river and Mississippi from Cairo down, but considerably higher in the Cumberland, than during January, 1874.

BAROMETRIC PRESSURE.

An examination of chart No. II shows the pressure to have been above the average in all the districts, except on the Gulf and Atlantic coasts, which is explained by the number of areas of unusually high barometers which have extended south and eastward from the Northwest over the entire country east of the Rocky Mountains. For January, 1874, the highest barometric pressure (30.20) covers the South Atlantic and Gulf States, and the lowest Lake Huron. For the present month the highest (30.25) extends south and eastward from the Northwest over Kansas, Missouri, Illinois and the western portion of Kentucky and Tennessee; the lowest over Maine and the eastern British Provinces.

Areas of low barometer.—From chart No. I it will be seen that twelve have been traced; of these four have crossed the United States from the Pacific to the Atlantic. A number of minor depressions, producing rain or snow and fresh to brisk winds, have been noticed, but only such as became dangerous are represented on the chart. The storm-centres have, approximately, been located for each synchronous observation, (three times daily,) as heretofore, the figures above the curves showing the dates of the month. In many cases, during the movement of storm-centres over the northern sections of the country, it is observed that minor depressions are developed on the Atlantic coast, which often become dangerous as they pass to the northeastward Another interesting feature, in the majority of cases, is the constant diminution of the pressure; that is, the barometric readings become less, and frequently greatly so, as the depression reaches the Eastern States. In detail the storms are as follows:

No. I appeared from Manitoba as an elongated, diminished pressure. It passed from thence southeastward over the Lake region, and gradually developed into a severe snow-storm the night of the 1st and 2d. Westerly gales extended on the 2d from the Upper Lakes to the Lower Lakes, Middle States and New England, and high easterly winds prevailed for a short time on the New England coast, during the passage of the depression from the Lower Lakes eastward over New England to Nova Scotia and New Brunswick. On the morning of the 3rd, the barometer at Sydney, Cape Breton, read 28.89 inches. A minor disturbance existed on the Gulf coast at the same time, producing high northerly winds on the Texas coast. Rainy weather accompanied these two in the Southern States, and snow north and northeast of the latter. High barometer No. I followed them.

No. II was first felt in the Gulf and South Atlantic States on the 6th, by the rainy weather and northeasterly winds which preceded it. Thunder-storms prevailed at Savannah and Augusta, Georgia. It was not until the 7th that its movement could be definitely traced. On its way northeastward along the coast it became quite a dangerous rain and snow storm. The lowest reading of the barometer, 29.40 inches, was reported from Halifax, Nova Scotia, on the morning of the 8th. During the night of the 7th, the easterly wind at Eastport, Maine, reached the velocity of 48 miles per hour. Rain, sleet or snow, principally the latter, fell from Tennessee, Kentucky, Indiana and Lake Huron, eastward over the Lower Lake region, Middle States, New England, St. Lawrence valley and the Eastern British Provinces.

No. III moved southeastward from the Pacific and north of Oregon during the night of the 6th and 7th, and passed within the limits of the stations so as to be accurately located on the night of the 7th and 8th. It was central near St Paul on the morning of the 7th, where it appears on the Signal Service Charts as an elongated barometric depression running north and south, which form it preserved in crossing the States. The easterly winds in advance of it only became dangerous from Maine east and northeastward. It was closely followed by high barometer No. III; also by northwesterly gales from the Missouri valley eastward over the Lake region, Middle States, New England, St. Lawrence valley and Eastern British Provinces. A very severe "Norther" extended over Texas during the night of the 8th and 9th, and continued on the 9th. The wind reached a velocity of 52 miles per hour at Indianola; at Alpena, 40; at Erie, 46; at Buffalo, 48; at Sandy Hook, 67; at Cape May, 42; at Peck's Beach, 38, and at Eastport, 42. Snow accompanied it in the northern sections, and occasional light rain in the Southern States.

No. IV was of minor importance. It was accompanied by brisk winds, and, after reaching lower Michigan and Lake Huron, by snow. On the 11th it disappeared northeastward into Canada, having been followed by high barometer No. IV.

No. V passed over Oregon from the Pacific on the 10th, and thence southeastward to Indian Territory, whence it took a northeastward course over the Lake region and north of the St. Lawrence river. The tri-daily Signal Service Maps show the gradual development of a well formed depression, No. VI, off the Atlantic coast on the 13th. The lowest barometric readings taken were at Montreal, on the night of the 13th, 29.62 inches; at Sydney, Cape Breton, afternoon of the 14th, 29.21 inches. North and west gales closely followed them. At Duluth a velocity of 36 miles per hour was reached; at Erie, 48; at Buffalo, 38; at Rochester, 35; at Montreal, 33; at Sandy Hook, 35; at Kittyhawk, on North Carolina coast, 45; at Halifax, 27. On the 18th, a severe "Norther" was felt in Texas, with a maximum velocity of 38 miles at Indianola. Thunder-storms were reported from a number of the stations in the Southern States. Over the northern sections of the country snow, sleet or rain prevailed during their passage, and in the Southern States, rainy weather. No. V was followed by high barometer No. V, which probably forced it to take a more southern course than it otherwise would have done, as it approached the Mississippi valley from the Rocky Mountains.

No. VII probably crossed the Pacific States, as very brisk easterly winds prevailed at Portland, Oregon, with snow on the 13th, after which the telegraphic reports are missing. On the 15th, it reached the Lower Missouri valley and southward. High winds and gales are reported to have accompanied it in Colorado and Kansas. Chart No. I shows it to have disappeared to the southeastward over the West Gulf States on the 16th, followed by a 'Norther" in Texas. It sent out to the eastward several minor depressions, producing light snow in the Upper Mississippi valley and the Lake region. Cloudy and rainy weather prevailed in the Gulf States.

No. VIII also crossed the country from the Pacific coast. From the Northwest eastward it appeared as an elongated depression, and during a portion of the time, as two distinct areas. The lowest barometric readings were at Portland, Oregon, on the 19th, 29.22 inches; at Escanaba, Mich., 29.73 inches; Eastport, Me., 29.76 inches; at Sydney, Cape Breton, 29.54 inches. High easterly winds or gales preceded it over the Northwest and Lake Michigan, on the 20th; over Lake Erie, on the morning of the 21st; at Eastport, Me, and Quebec Canada, on the 22d. High westerly winds followed it in the Lake region; also a "Norther" in Texas on the 22d. Cloudy and rainy weather accompanied it in the Southern States, generally light rain, sleet, or snow in the northern sections, and heavy snow at Portland, Oregon. It was followed by high barometer, No. VIII.

No. IX has also been traced from the Pacific. The high temperature, southerly winds and heavy rains, at Portland, prove that the central depression passed north of that station. As shown on the chart, it developed into two well-defined centres by midnight of the 24th. The lowest barometric readings occurred at Buffalo, 29.63 inches; at Father Point, Canada, 29.41 inches; at Eastpart, Me., 29.50 inches; at Cape Roziere, Canada, 29.28 inches. Easterly gales preceded it on Lake Erie, in the St. Lawrence valley, and from Maine northeastward. It was followed in the northern sections by high westerly winds or gales, and snow, sleet or rain; in the Southern States by generally heavy rains and frequent thunder-storms. The maximum velocities of wind reported

during the passage of this storm are, at Port Huron, 28 miles per hour; Toledo, 36; Erie, 44; Rochester, 36; Sandy Hook, 45; Cape May, 32; Wood's Hole, 28; Eastport, 32. It was followed by high barometer No. IX.

No. X passed over California on the 25th. At San Francisco the northerly gale reached a velocity of 48 miles per hour on the 26th, with clear weather. The shipping in the harbor sustained considerable damage. After leaving the Rocky Mountains, it was forced to take a southerly course for a time, by a high barometer which had extended over the Northwest on the 26th and 27th. During the afternoon of the 28th, it appeared on the Signal Service maps as an extremely long depression, extending from Texas northeastward over Tennessee, Kentucky, West Virginia, Pennsylvania, New York and into Canada. High winds occurred principally in the Southern States on the 27th, 28th and 29th, accompanied with thunder-storms, which were reported from some places as violent. The highest wind velocities were recorded at Montgomery on the 28th—33 miles per hour; at Wilmington and Galveston on the 29th, 28 miles.

No. XI could not be definitely traced as it moved north of the Lake region. Cloudy weather, with generally light snow and brisk or high winds, prevailed in the Northwest, upper Mississippi valley and Lake region. Toledo reported a southwest gale during the morning of the 30th.

No. XII moved down the Missouri valley, as shown on the chart. It slowly developed into two distinct depressions. The one passing along the New England coast was felt as a severe snow-storm. The highest wind velocities were reported from Eastport, Me., NE., twenty-seven miles; Galveston, Texas, morning of 31st, N., forty miles, accompanying a "Norther." Snow or sleet attended it in the sections north of Tennessee.

High barometers.—Of these ten have been traced, as seen on Chart No. I, in red. The most remarkable one of the month was No. III, following Storm No. III, on account of the unusually high barometric readings, highest 30.97 inches, at Leavenworth, Kansas, morning of the 9th, extremely cold weather and high northwesterly winds, which accompanied it from from the Rocky Mountain stations eastward over all the States, and in Texas the very severe "Norther" of the 9th. The next of importance was No. V, the highest barometric reading, 30.86 inches, having been reported from Yankton, Dakota. As these areas move eastward the barometric readings grow less, directly the opposite of the low barometers.

The "Northers" of the Southwest are intimately connected with these high barometric areas, and in the majority of cases, especially the more severe ones, they have been predicted in the "probabilities" from eighteen (18) to thirty-two (32) hours in advance of their arrival.

Atmospheric temperature.—The curves in red on Chart No. II are the isothermal lines for the month. The table in left hand lower corner of same chart gives the average of mean temperatures, by districts, for January of this year; also those for many years. From these it appears that the weather has been decidedly colder than usual, especially from the Missouri valley to the Middle and Eastern States, except in the South Atlantic States only slightly so. For Portland, Oregon, the mean is over ten degrees below that of January, 1874. This is, no doubt, due to the extensive areas of high barometer which, first appearing in the extreme Northwest, have swept south and eastward across the country east of the Rocky Mountains. Many observers mention it as

the coldest month for many years. On Mount Washington the minimum temperature registered forty-six degrees below zero on the 27th; at Denver, Colorado, on the 9th, twenty-nine degrees below, the lowest ever known. The accompanying table, giving the readings of the minimum thermometers at the different stations in the morning, is quite interesting, in that it shows the south and eastward progress of the areas of cold accompanying high barometers Nos. III and V.

Stations.	Jan. 8.	Jan. 9.	Jan. 10.	Jan. 11.	Jan. 12.	Jan. 13.	Jan. 14.	Jan. 15.
Pembina, D. T.....	——	—38	—28	——	——	—28	—30	——
Breckenridge.....	—31	—33	——	——	—14	—34	—31	——
Cheyenne, Wy. T...	—23	—38	——	1	—23	—26	—15	23
St. Paul, Minn.....	3	—30	—17	—23	— 6	— 8	—25	—22
Escanaba, Mich.....	— 9	——	—17	— 9	— 1	10	— 6	—10
Alpena, Mich.....	2	— 4	—12	— 1	— 5	17	6	— 5
Omaha, Neb.....	—10	—19	— 2	1	7	—17	—17	—10
Chicago, Ill.....	8	—20	— 3	2	19	18	— 8	— 9
St. Louis, Mo.....	21	—15	— 2	11	18	15	— 2	— 2
Fort Gibson, I. T...	20	——	2	15	32	6	2	8
Indianola, Texas....	40	21	19	31	37	43	28	32
Montgomery, Ala...	43	40	18	34	39	46	43	29
Louisville, Ky.....	15	— 6	— 5	6	20	34	13	5
Pittsburgh, Pa.....	16	22	—12	— 1	10	32	17	4
Augusta, Ga.....	38	44	26	28	33	34	40	35
Rochester, N. Y.....	18	19	— 9	——	2	22	19	8
New York, N. Y....	27	25	— 6	3	14	19	26	11
Washington, D. C...	27	30	— 3	8	21	26	36	13
Albany, N. Y.....	16	16	— 6	—12	— 5	11	24	3
Boston, Mass.....	26	17	0	0	7	19	20	9
Eastport, Me.....	15	8	6	— 1	3	2	24	— 4

PRECIPITATION.

The distribution of rain and melted snow is illustrated on Chart No. III. In the left-hand lower corner of same is a table giving the averages, by districts, for January of this and of many years. Large excesses occurred in the South Atlantic States, East Gulf States and Tennessee. In some sections, especially in portions of New England, the deficiency has given rise to droughts, probably assisted by the light rains and cold weather during the early winter. The number of days on which rain or snow fell during the month averages as follows in the districts mentioned: New England and Middle Atlantic States, 14; South Atlantic and Eastern Gulf States and Tennessee, 17; Western Gulf States, 14; Lower Lake region, 19; Upper Lake region, 15; Ohio valley, 13; Northwest, 10.

HUMIDITY.

The percentages of relative humidity for the different districts average as follows: New England, 73 per cent.; Middle Atlantic States, 74; South Atlantic States, 79; Gulf States, 82; Lower Lake region, 79; Upper Lake region, 70; Ohio valley, Tennessee and the Northwest, 73. As usual, the mean relative humidity has been lowest at the Rocky Mountain stations, amounting to 56 at Denver and 51 at Santa Fe.